gen or the presence of cyanide (which renders unavailable the oxygen present) remarkably well. Warburg finds that fertilized sea-urchin eggs anesthetized by phenyl urethane, so as to be incapable of cell-division, show nevertheless the same oxygen-consumption as the normal unanesthetized eggs. Again, lack of oxygen interferes only gradually with the ciliary action in many organisms, while anesthetics in sufficient concentration arrest the movement instantly. It seems necessary to conclude from these facts that the essential action of the anesthetic is of a more general kind, and consists in incapacitating some mechanism which is essential to the normal activities of the cell, whether these immediately require oxygen or not.

The evidence which I have reviewed indicates either that this mechanism is the plasma-membrane itself, or that it is closely dependent on the condition of the plasma-membrane. Any condition that renders the membrane incapable of responding to changes of condition by rapid changes of permeability and of electrical polarization has an anesthetic influence. This modification in the properties of the membrane may be produced either by changing the general condition of the colloids forming it—as in the case of magnesium salts or electrolytes in general—or by specifically altering the state of the lipoid-components, as by organic anesthetics. It is impossible to say at present precisely why the solution of an anesthetic in the lipoids of the membrane should thus alter the properties of this structure. The nearest physico-chemical analogy seems to be the so-called "protective action" of colloids, as exemplified in those cases in which the presence of one colloid interferes with or prevents changes of aggregation-state in another, *e. g.*, when gelatine prevents the precipitation of colloidal gold or platinum by a neutral salt like sodium chloride. Apparently the lipoids are related to the other colloids of the membrane in such a manner that the condition of the lipoids affects the entire properties of the colloidal structure, and so determines the effect which an electrolyte like NaCl, or a stimulating condition like an electric shock or mechanical impact, may have upon it. Hence when a lipoid-solvent acts upon the membrane, and dissolves in the lipoids of the latter, it may profoundly change the physical properties of the membrane and hence the responsiveness of the whole tissue or organism to stimulation. On this view the membrane is a main controlling factor in cell-processes, and by changing its state we may alter the entire physiological activity of the cell.

RALPH S. LILLIE
UNIVERSITY OF PENNSYLVANIA

PSYCHOLOGISTS AS ADMINISTRATORS[1]

CASUAL statements have frequently been made to the effect that many psychologists leave their professional careers to become administrators of one sort or another, or carry on executive work of a definite kind in addition to their activities as psychologists, with the appended implication that psychology, as a science, suffers a proportionately greater loss of effective workers on this account than do the other sciences. As illustrations of this loss, not a few well-known examples are cited. At first blush, the generalization thus made might be classed under the fallacy of *post hoc, ergo propter hoc,* but in order to escape this charge ourselves, we must submit the matter to some statistical presentation.

The executive positions to which academic men are obviously called are presidencies of colleges and universities, and deanships of departments within colleges and universities. Farther down the scale, viz., directorships of laboratories and headships of divisions and

[1] Read before the meeting of the Experimental Psychologists at Wesleyan University on April 12, 1913.

specific departments, the positions are often only nominal in nature and vary so much from place to place in their attached duties that it does not seem wise to include them in our discussion. The question arises, then, as to which disciplines out of a given group contribute the most men for these executive positions and in what proportions they contribute them. To answer this we selected, from a list of colleges and universities in the United States for the year 1910–11,[2] those institutions which are neither denominational nor technically specialized. This list of 177 institutions was subdivided into those whose enrollment of students was above the 1,000 mark and those whose enrollment was below that mark, with the hope that this crude distinction between the large institution and the small might bring to light a difference in the kind of administrator demanded. The names of the presidents were then looked up in "Who's Who in America" in order to determine their fields of professional interest before they assumed charge of their administrative work. Where interest was considered to be equally divided in several fields, the count was fractionated accordingly. The results are thrown into two classifications: the first may be considered as absolutely determined, the other as relatively determined. Concretely, in the first case, the disciplines are presented in order of rank based upon the per cent. of representation in all the disciplines found; in the second case, a half-dozen sciences are chosen, and the relative rank of representation is given in terms of a per cent. based upon the total representation in these few sciences. The selection of these sciences was made on the basis of a possible comparison of relative worth. Unfortunately there were no available statistics for all disciplines dealt with in the first classification, but in the "Biographical Directory of American Men of Science,"[3] the author found a scale of proportionate values which served as a means of possible interpretation in the second classification. In this directory of over 4,000 names, the relative number of men engaged in about a dozen sciences is given. Some of these sciences are not represented in our lists and are, therefore, not relevant to this discussion. We are forced to limit ourselves, consequently, to the following six sciences to which are attached the corresponding relative per cent. of men engaged in the given activity on the basis of the total number engaged in all of the six activities: biology (27 per cent.), chemistry (22 per cent.), physics (21 per cent.), geology (14 per cent.), mathematics (10 per cent.), and psychology (6 per cent.). The same method of classification was used with a list of 97 deans of colleges and of college departments of universities which were not specialized in profession, *i. e.*, schools of "applied science," "engineering," "medicine," "theology," etc., were not considered because they usually always demanded an executive whose interest lay in the corresponding field of activity. These names were chosen from the 1910–11 catalogues of 42 leading colleges and universities.

[2] This list was furnished by the *World's Almanac* for that year and corroborated by reference to the Report of the Commissioner of Education for the same year.

[3] New York, 1911.

CLASSIFICATION 1

111 Presidents of Institutions below 1,000 Student Enrollment	Per Cent.	66 Presidents of Institutions above 1,000 Student Enrollment	Per Cent.	97 Deans	Per Cent.
Theology	23	Education	20	Mathematics	16
Mathematics	13	Chemistry	15	Class. Lit	12
English	10	Philosophy	10	English	12
Education	8	Mathematics	9	History	10
Mod. Lang's	7	Polit. Science	9	Polit. Science	10

CLASSIFICATION 2

28 Presidents of Institutions below 1,000 Student Enrollment	Per Cent.	21 Presidents of Institutions above 1,000 Student Enrollment	Per Cent.	38 Deans	Per Cent.
Biology	5		7		11
Chemistry	33		11		13
Physics	24		14		23
Geology	5		4		2
Mathematics	28		52		40
Psychology	5		12		11

The totals for the second classification are: biology 7.7 per cent., chemistry 19 per cent., physics 20.3 per cent., geology 3.7 per cent., mathematics 40 per cent., and psychology 9.3 per cent.

These tables show, then, that (1) under the absolute classification in the first array, psychology does not appear at all in the rank of the first five disciplines represented, but that (2) under the relative classification of our second array, whereas psychology has the fewest number of representatives engaged in activity in its field, it stands, on the average, fourth on the list of executive representatives, and, if we get its comparative rank in terms of the relative number engaged in the profession, we find that it stands next to the top. This result was obtained by dividing the average per cent., as given in the second table, by the per cent. of number engaged in the profession as outlined above. This value might be termed, for the sake of this discussion, the efficiency-value and results as follows: mathematics 4.00, psychology 1.55, physics .94, chemistry .86, biology .29, and geology .24.

Another investigation was carried on from a slightly different angle. This study was not, like the second classification, a comparative one in terms of other sciences. The question arose as to how many psychologists of repute have been engaged in executive work since they began activity in the field of the science. For this purpose the membership list of the American Psychological Association and Cattell's "American Men of Science" (2d, 1911, edition) were consulted. From the former, a list of about 300 names, 150 names of persons who were recognized in the latter as psychologists were drawn. These names were subdivided into two groups: those recognized as eminent, *i. e.*, among the 1,000 scientists of the country, and, the remainder, those who were not so considered. It was deemed that they had performed executive work if, after they had held some responsible position in psychology, they had become administrators in the sense of the above classifications, or if they had held, or were holding, such positions as superintendencies or principalships of schools, directorships of institutions, or other equivalent positions. It was found that in the first group there were 12 executives out of a possible total of 42 (29 per cent.), and in the second group 36 out of 108 (33 per cent.) came under the rubric of executives. This, the investigator believes, is a fairly large portion of the total, but there is, of course, no ground for believing that psychology is making a better showing in this respect than other sciences, except in so far as the second classification, given above, distinctly indicates it. Undoubtedly, on the score of this classification, the conclusion that psychology, next to mathematics, is contributing more executives relatively than the other sciences mentioned, is valid; and the supposition that the comparison between these sciences, chosen only with reference to available statistics, is fair, must be left to the judgment of the readers of this article.

CHRISTIAN A. RUCKMICH
CORNELL UNIVERSITY

THE PLANT INDUSTRY HALL OF THE UNIVERSITY OF NEBRASKA

ON June 10 the University of Nebraska dedicated a new building known as the Plant Industry Hall, to be occupied by the departments of agricultural botany, in charge of Professor Wilcox; horticulture, in charge of Professor Emerson, and entomology, in charge of Professor Bruner. The new building is 140 by 65 feet, and consists of three stories above the basement. It is of strictly fireproof construction throughout.

Short addresses were made by Architect Chowins, Regent Whitmore and Dean Burnett. The principal address on "Practical Science" was given by Professor Dr. John M. Coulter, of the University of Chicago, and will be printed in SCIENCE. These addresses were followed by the ceremony of conferring the honorary degree of doctor of agriculture upon Dean Herbert J. Webber, of the University of California, and Dean Albert F. Woods, of the University of Minnesota.

In conferring these degrees, Chancellor Avery said: